VELTECH MULTI TECH

Dr RANGARAJAN Dr. SAKUNTHALA ENGINEERING COLLEGE

(Owned by Vel Trust 1997)

(An ISO 9001: 2008 Certified Institution)

Accredited By NAAC with 'A' Grade and NBA Accredited Institution

(Approved by AICTE New Delhi and Govt. of Tamil Nadu, Affiliated to Anna University Chennai)

SYLLABUS

WEEKLY SCHEDULE

III SEMESTER 2017-18

DEPARTMENT OF BIO MEDICAL ENGINEERING

IV YEAR DEGREE COURSE

#42, Avadi – Vel Tech Road,
Avadi
Chennai – 600062
Telefax – 044-26841061
E-mail: emailto@veltechmultitech.org
Website : www.veltechmultitech.org

INSTITUTE VISION & MISSION

VISION:

Elevating well being of humanity by augmenting human resource potential through Quality technical education and training.

MISSION:

- To effectuate supremacy in technical education through articulation of research and industry practices for social relevance.
- To inculcate the habit of lifelong learning.
- To exhibit professional ethics, commitment and leadership qualities.

DEPARTMENT VISION & MISSION

VISION:

- To establish teaching and research platform in medical electronics for the health and well being of mankind.

MISSION:

- To disseminate fundamental knowledge on medical electronics for professional developments.
- To propagate lifelong learning.
- To impart the right proportion of knowledge, attitudes and ethics in students to enable them take up positions of responsibility in the society and make significant contributions.

PROGRAM EDUCATIVE OBJECTIVES

1. To enrich the students to liberate themselves in learning skills involving complex thoughts, problem analysis and finding solutions.
2. To identify opportunities and develop the level of competency in technical and communication skills to establish their excellence in professionalism.
3. To implement the versatile qualities acquired to a chosen career, by providing an impact for the sustainable growth and success.
4. To explore their ideas in research and promoting them to be exceptionally good in meeting the challenges of innovation and creativity.
5. To have a diversified knowledge in medical practices and instrumentation to recognise the needs of society and serve people with professional ethics.

Programme Outcomes (POs)

Graduates of the 4-year B.E. Biomedical Engineering (BME) Programme will:

1. Be fundamentally strong in life sciences and to apply the knowledge of engineering sciences in solving mathematical and scientific problems related to healthcare.
2. Be able to Identify, formulate and analyze complex problems related to biomedical and their solutions using principles of mathematics, natural science and engineering.
3. Be able to design and develop biomedical devices to meet the societal and environmental requirements.
4. Be able to use research knowledge and methods to analyze, investigate complex problems to find suitable conclusions related to biomedical engineering.
5. Be able to learn necessary skills/techniques to develop mathematical models and to implement appropriate software tools in the design of health care devices.
6. Be able to apply contextual knowledge to assess societal, health and safety related issues relevant to biomedical field
7. Be able to understand the impact of medical engineering problems in a global, economical and societal context.
8. Be able to understand professional, social and ethical responsibilities
9. Be able to function effectively as an individual, entrepreneur and as a member or a leader in multi-disciplinary streams.

10. Be proficient in English language in order to communicate effectively on complex engineering activities on a global scale and to make comprehensive reports and presentations.
11. Function effectively and to demonstrate financial and managerial skills to accomplish projects.
12. Engage in life-long learning to recognize the latest technological changes to meet the societal demands.

WEEK DETAILS

SL.NO.	WEEK	FROM	TO
1	**WEEK1**	**24.06.2017**	**24.06.2017**
2	**WEEK2**	**26.06.2017**	**01.07.2017**
3	**WEEK3**	**03.07.2017**	**08.07.2017**
4	**WEEK4**	**10.07.2017**	**15.07.2017**
5	**WEEK5**	**17.07.2017**	**22.07.2017**
6	**WEEK6**	**24.07.2017**	**29.07.2017**
7	**WEEK7**	**31.08.2017**	**05.08.2017**
8	**WEEK8**	**07.08.2017**	**12.08.2017**
9	**WEEK9**	**14.08.2017**	**19.08.2017**
10	**WEEK10**	**21.08.2017**	**26.08.2017**
11	**WEEK11**	**28.08.2017**	**2.09.2017**
12	**WEEK12**	**04.09.2017**	**9.09.2017**
13	**WEEK13**	**11.09.2017**	**16.09.2017**
14	**WEEK14**	**18.09.2017**	**23.09.2017**
15	**WEEK15**	**25.09.2017**	**30.10.2017**
16	**WEEK16**	**02.10.2017**	**07.10.2017**
17	**WEEK17**	**09.10.2017**	**14.10.2017**

SUBJECT CONTENTS

SL.NO	SUBJECT CODE	SUBJECT NAME
THEORY		
1	MA6351	Transforms and Partial Differential Equations
2	BM6301	Bio Chemistry
3	EC6303	Signals and Systems
4	BM6302	Sensors and Measurements
5	EC6301	Object Oriented Programming and Data
6	BM6303	Anatomy and Human Physiology
PRACTICAL		
7	BM6311	Bio Chemistry and Human Physiology Laboratory
8	BM6312	OOPS and Data Structures Laboratory

TEST / EXAM SCHEDULE

SL.NO	SUBJECT CODE	SUBJECT NAME	UNIT TEST I	UNIT TEST II	Pre Model Exam	UNIT IV
1	MA6351	Transforms and Partial Differential Equations	10.07.2017 FN	27.07.2017 FN	16.08.2017	07.09.2017
2	BM6301	Bio Chemistry	10.07.2017 AN	27.07.2017 AN	17.08.2017	07.09.2017
3	EC6303	Signals and Systems	11.07.2017 FN	28.07.2017 FN	18.08.2017	08.09.2017
4	BM6302	Sensors and Measurements	11.07.2017 AN	28.07.2017 AN	19.08.2017	08.09.2017
5	EC6301	Object Oriented Programming and Data Structures	12.07.2017 FN	29.07.2017 FN	20.09.2017	09.10.2017
6	BM6303	Anatomy and Human Physiology	12.07.2017 AN	29.07.2017 AN	21.09.2017	09.10.2017

S.NO	SUBJECT CODE	SUBJECT NAME	MODEL EXAM
1	MA6351	Transforms and Partial Differential Equations	28.09.2017
2	BM6301	Bio Chemistry	04.10.2017
3	EC6303	Signals and Systems	06.10.2017
4	BM6302	Sensors and Measurements	09.10.2017
5	EC6301	Object Oriented Programming and Data Structures	11.10.2017
6	BM6303	Anatomy and Human Physiology	13.10.2017

MA6351 TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS

WEEK 1

UNIT I PARTIAL DIFFERENTIAL EQUATIONS

Formation of partial differential equations

WEEK 2

Singular integrals - Solutions of standard types of first order partial differential equations, Lagrange's linear equation --

WEEK 3

Linear partial differential equations of second and higher order with constant coefficients of both homogeneous and Non-homogeneous types.

WEEK 4 UNIT TEST-I

UNIT II FOURIER SERIES

Dirichlet's conditions – General Fourier series – Odd and even functions – Half range sine series

WEEK 5

Half range cosine series – Complex form of Fourier series

WEEK 6

Parseval's identity – Harmonic analysis

WEEK 7 UNIT TEST II

WEEK 8

UNIT III APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS

Classification of PDE – Method of separation of variables - Solutions of one dimensional wave Equation

WEEK 9

One dimensional equation of heat conduction – Steady state solution of two dimensional

Equation of heat conduction (excluding insulated edges)

WEEK 10

UNIT IV FOURIER TRANSFORMS

Statement of Fourier integral theorem – Fourier transforms pair – Fourier sine

WEEK 11

Cosine transforms – Properties

WEEK 12

Transforms of simple functions – Convolution theorem – Parseval's identity

WEEK 13 PRE MODEL EXAM

WEEK 14

UNIT V Z - TRANSFORMS AND DIFFERENCE EQUATIONS

Z- Transforms - Elementary properties – Inverse Z - transform (using partial fraction and residues)

WEEK 15

Convolution theorem - Formation of difference equations

WEEK-16

Solution of difference equations using Z – transform

WEEK-17- MODEL EXAM

WEEK-18- MODEL EXAM

TEXT BOOKS:

1. Veerarajan. T., "Transforms and Partial Differential Equations", Tata McGraw Hill Education Pvt.Ltd., New Delhi, Second reprint, 2012.
2. Grewal. B.S., "Higher Engineering Mathematics", 42nd Edition, Khanna Publishers, Delhi, 2012.
3. Narayanan.S, Manicavachagom Pillay.T.K and Ramanaiah.G "Advanced Mathematics for Engineering Students" Vol. II & III, S.Viswanathan Publishers Pvt Ltd.1998.

REFERENCES:

1. Bali.N.P and Manish Goyal, "A Textbook of Engineering Mathematics", 7th Edition, Laxmi Publications Pvt Ltd , 2007.
2. Ramana.B.V., "Higher Engineering Mathematics", Tata McGrawHill Publishing Company Limited, New Delhi, 2008.
3. Glyn James, "Advanced Modern Engineering Mathematics", 3rd Edition, Pearson Education, 2007.
4. Erwin Kreyszig, "Advanced Engineering Mathematics", 8th Edition, Wiley India, 2007.
5. Ray Wylie. C and Barrett.L.C, "Advanced Engineering Mathematics" Tata Mc Graw Hill Education Pvt Ltd, Sixth Edition, New Delhi, 2012.
6. Datta.K.B., "Mathematical Methods of Science and Engineering", Cengage Learning India Pvt Ltd, Delhi, 2013

BM6301 BIO CHEMISTRY

WEEK 1

UNIT I INTRODUCTION TO BIOCHEMISTRY

Introduction to Biochemistry

WEEK 2

Water as a biological solvent, weak acid and bases, pH, buffers, Handerson-Hasselbalch equation, Physiological buffers, fitness of the aqueous environment for living organism.

WEEK 3

Principle of viscosity, Surface tension, adsorption, diffusion, osmosis and their applications in biological systems

WEEK 4 UNIT TEST-I

UNIT II CARBOHYDRATES

Classification of carbohydrates - mono, di, oligo and polysaccharides. Isomerism, racemisation and mutarotation .Structure, physical and chemical properties of carbohydrates

WEEK 5

Metabolic pathways and bioenergetics – Glycolysis, glycogenesis, glycogenolysis and its hormonal regulation.

WEEK 6

TCA cycle and electron transport chain. Oxidative phosphorylation

WEEK 7 UNIT TEST-II

WEEK 8

UNIT III LIPIDS

Classification of lipids- simple, compound and derived lipids. Nomenclature of fatty acid, physical and chemical properties of fat. Saponification number, Reichert- Meissl number and iodine number. Metabolic pathways:

WEEK 9

Synthesis and degradation of fatty acid (beta oxidation), hormonal regulation of fatty acid metabolism, ketogenesis, structural architecture and significance of biological membrane

WEEK 10

UNIT IV NUCLEIC ACID & PROTEIN

Structure of purines and pyrimidines, nucleoside , nucleotide , DNA act as a genetic material chargoffs rule. Watson and crick model of DNA

WEEK 11

Structure of RNA and its type. Classification, structure and properties of proteins, structural organization of proteins

WEEK 12

Classification and properties of aminoacids. Separation of protein: gel filtration, electrophoresis and ultracentrifugation

WEEK 13 PRE MODEL EXAM

WEEK 14

UNIT V ENZYME AND ITS KINETICS

Classification of enzymes, apoenzyme, coenzyme, holoenzyme and cofactors. Kinetics of enzymes - Michaelis-Menten equation. Factors affecting enzymatic activity: temperature, pH, substrate concentration and enzyme concentration

WEEK 15

Inhibitors of enzyme action: Competitive, non- competitive, irreversible. Enzyme: Mode of action

WEEK-16

Allosteric and covalent regulation. Clinical significance of enzymes. Measurement of enzyme activity and interpretation of units

WEEK-17- MODEL EXAM

WEEK-18- MODEL EXAM

TEXT BOOKS:

1. David.W.Martin, Peter.A.Mayes , Victor. W.Rodwell, "Harper's Review of Biochemistry", LANGE Medical Publications, 1981
2. Keith Wilson & John Walker, "Practical Biochemistry - Principles & Techniques", Oxford University Press, 2009.

REFERENCES:

1. Trevor palmer, "Understanding Enzymes", Ellis Horwood Ltd. 1991.
2. Pamela.C.Champe & Richard.A.Harvey, "Lippincott Biochemistry Lippincott's Illustrated Reviews",Raven publishers,1994

EC6303 SIGNALS AND SYSTEMS

WEEK 1

UNIT I CLASSIFICATION OF SIGNALS AND SYSTEMS

Continuous time signals (CT signals)

WEEK 2

Discrete time signals (DT signals) - Step, Ramp, Pulse, Impulse, Sinusoidal, Exponential, Classification of CT and DT signals - Periodic & Aperiodic signals, Deterministic & Random signals, Energy & Power signals - CT systems and DT systems

WEEK 3

Classification of systems – Static & Dynamic, Linear & Nonlinear, Time-variant & Time-invariant, Causal & Noncausal, Stable & Unstable

WEEK 4 UNIT TEST-I

UNIT II ANALYSIS OF CONTINUOUS TIME SIGNALS

Fourier series analysis-spectrum of Continuous Time (CT) signals

WEEK 5

Fourier and Laplace Transforms in CT Signal Analysis

WEEK 6

Fourier and Laplace Transforms Properties

WEEK 7 UNIT TEST-II

WEEK 8

UNIT III LINEAR TIME INVARIANT- CONTINUOUS TIME SYSTEMS

Differential Equation-Block diagram representation-impulse response, convolution integrals

WEEK 9

Fourier and Laplace transforms in Analysis of CT systems

WEEK 10 UNIT TEST-III

UNIT IV ANALYSIS OF DISCRETE TIME SIGNALS

Baseband Sampling - DTFT

WEEK 11

Properties of DTFT.

WEEK 12

Z Transform – Properties of Z Transform

WEEK 13 UNIT TEST-IV

WEEK14

UNIT V LINEAR TIME INVARIANT-DISCRETE TIME SYSTEMS

Difference Equations-Block diagram representation-Impulse response

WEEK 15

Convolution sum- Discrete Fourier

WEEK-16

Z Transform Analysis of Recursive & Non-Recursive systems

WEEK-17- MODEL EXAM

WEEK-18- MODEL EXAM

TEXT BOOK:

1. Allan V.Oppenheim, S.Wilsky and S.H.Nawab, "Signals and Systems", Pearson, 2007

REFERENCES:

1. B. P. Lathi, "Principles of Linear Systems and Signals", Second Edition, Oxford, 2009.
2. R.E.Zeimer, W.H.Tranter and R.D.Fannin, "Signals & Systems - Continuous and Discrete", Pearson, 2007.
3. John Alan Stuller, "An Introduction to Signals and Systems", Thomson, 2007.
4. M.J.Roberts, "Signals & Systems Analysis using Transform Methods & MATLAB", Tata McGraw Hill, 2007.

BM6302 SENSORS AND MEASUREMENTS

WEEK 1

UNIT I SCIENCE OF MEASUREMENT

Measurement System – Instrumentation

WEEK 2

Classification and Characteristics of Transducers – Static and Dynamic

WEEK 3

Errors in Measurements – Calibration – Primary and secondary standards

WEEK 4 UNIT TEST-I

UNIT II DISPLACEMENT, PRESSURE, TEMPERATURE SENSORS

Strain Gauge: Gauge factor, sensing elements, configuration, unbounded strain gage, biomedical applications; strain gauge as displacement & pressure transducers: Capacitive transducer, Inductive transducer

WEEK 5

LVDT, Passive types: RTD materials & range, relative resistance vs. temperature characteristics, thermistor characteristics

WEEK 6

Biomedical applications of Temperature sensors. Active type: Thermocouple – characteristics

WEEK 7 UNIT TEST-II

WEEK 8

UNIT III PHOTOELECTRIC AND PIEZO ELECTRIC SENSORS

Phototube, scintillation counter, Photo Multiplier Tube (PMT), photovoltaic, Photo conductive cells, photo diodes, phototransistor, comparison of photoelectric transducers

WEEK 9

Pectro photometric applications of photo electric transducers, Piezoelectric active transducer and biomedical applications as pressure & Ultrasound transducer

WEEK 10 UNIT TEST-III

UNIT IV SIGNAL CONDITIONING & SIGNAL ANALYSER

AC and DC Bridges –wheat stone bridge, Kelvin, Maxwell

WEEK 11

Hay, Schering – Concepts of filters, Preamplifier

WEEK 12

Impedance matching circuits – isolation amplifier. Spectrum analyzer

WEEK 13 UNIT TEST-IV

WEEK14

UNIT V DISPLAY AND RECORDING DEVICES

Digital voltmeter – Multi meter – CRO – block diagram, CRT – vertical & horizontal deflection system, DSO

WEEK 15

LCD monitor, PMMC writing systems, servo recorders, photographic recorder

WEEK-16

Magnetic tape recorder, Inkjet recorder, thermal recorder

WEEK-17- MODEL EXAM

WEEK-18- MODEL EXAM

TEXT BOOK:

1. A.K.Sawhney, "Electrical & Electronics Measurement and Instrumentation", 10th edition, Dhanpat Rai & Co, New Delhi, 2010.

REFERENCES:

1. Ernest O Doebelin and Dhanesh N Manik, Measurement systems, Application and design, 5th edition, Mc Graw-Hill, 2007.
2. Khandpur R.S, "Handbook of Biomedical Instrumentation", Tata McGraw-Hill, New Delhi, 2003.
3. Leslie Cromwell, "Biomedical Instrumentation and measurement", Prentice hall of India, New Delhi, 2007.
4. John G. Webster, "Medical Instrumentation Application and Design", John Wiley and sons, New York, 2004.
5. L.A Geddas and L.E.Baker, "Principles of Applied Biomedical Instrumentation", John Wiley and Sons, Third Edition, Reprint 2008.
6. Albert D.Helfrick and William D. Cooper. Modern Electronic Instrumentation and Measurement Techniques", Prentice Hall of India, 2007.

EC6301 OBJECT ORIENTED PROGRAMMING AND DATA STRUCTURES

WEEK 1

UNIT I DATA ABSTRACTION & OVERLOADING

Overview of C++

WEEK 2

Structures – Class Scope and Accessing Class Members – Reference Variables – Initialization – Constructors – Destructors, Member Functions and Classes – Friend Function

WEEK 3

Dynamic Memory Allocation – Static Class Members, Container Classes and Integrators – Proxy Classes – Overloading: Function overloading and Operator Overloading

WEEK 4 UNIT TEST-I

UNIT II INHERITANCE & POLYMORPHISM

WEEK 5

Base Classes and Derived Classes – Protected Members – Casting Class pointers and Member Functions – Overriding – Public, Protected and Private Inheritance – Constructors and Destructors in derived Classes – Implicit Derived

WEEK 6

Class Object To Base – Class Object Conversion – Composition Vs. Inheritance – Virtual functions – This Pointer – Abstract Base Classes and Concrete Classes –Virtual Destructors – Dynamic Binding

WEEK 7 UNIT TEST-II

WEEK 8

UNIT III LINEAR DATA STRUCTURES

Abstract Data Types (ADTs) – List ADT – array-based implementation – linked list implementation — singly linked lists

WEEK 9

Polynomial Manipulation - Stack ADT – Queue ADT - Evaluating arithmetic expressions

WEEK 10 UNIT TEST-III

UNIT IV NON-LINEAR DATA STRUCTURES

Trees – Binary Trees – Binary tree representation and traversals – Application of trees

WEEK 11

Set representation and Union-Find operations – Graph and its representations – Graph Traversals

WEEK 12

Representation of Graphs – Breadth-first search – Depth-first search - Connected components

WEEK 13 UNIT TEST-IV

WEEK 14

UNIT V SORTING AND SEARCHING

Sorting algorithms: Insertion sort

WEEK 15

Quick sort - Merge sort

WEEK-16

Searching: Linear search –Binary Search

WEEK-17- MODEL EXAM

WEEK-18- MODEL EXAM

TEXT BOOKS:

1. Deitel and Deitel, " C++, How To Program", Fifth Edition, Pearson Education, 2005.
2. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C++", Third Edition, Addison- Wesley, 2007.

REFERENCES:

1. Bhushan Trivedi, " Programming with ANSI C++, A Step-By-Step approach", Oxford University Press, 2010.
2. Goodrich, Michael T., Roberto Tamassia, David Mount, "Data Structures and Algorithms in C++", 7th Edition, Wiley. 2004.
3. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to Algorithms", Second Edition, Mc Graw Hill, 2002.
4. Bjarne Stroustrup, "The C++ Programming Language", 3rd Edition, Pearson Education, 2007.
5. Ellis Horowitz, Sartaj Sahni and Dinesh Mehta, Fundamentals of Data Structures in C++, Galgotia Publications, 2007.

BM6303 ANATOMY AND HUMAN PHYSIOLOGY

WEEK 1

UNIT I BASIC ELEMENTS OF HUMAN BODY

Cell: Structure and organelles

WEEK 2

Functions of each component in the cell, Cell membrane, Transport across membrane – origin of cell membrane potential – Action potential

WEEK 3

Tissue: Types – Specialized tissues – functions.

WEEK 4 UNIT TEST-I

UNIT II SKELETAL AND RESPIRATORY SYSTEM

Skeletal system: Bone types and functions – Joint - Types of Joint - Cartilage and functions. Respiratory System

WEEK 5

Components of respiratory system – Respiratory Mechanism

WEEK 6

Types of respiration - Oxygen and carbon dioxide transport and acid base regulation

WEEK 7 UNIT TEST-II

WEEK 8

UNIT III CIRCULATORY SYSTEM

Blood composition - functions of blood – functions of RBC. WBC types and their functions. Blood groups – importance of blood groups – identification of blood groups. Blood vessels- Structure of heart

WEEK 9

Properties of Cardiac muscle – Conducting system of heart – Cardiac cycle – ECG – Heart sound - Volume and pressure changes and regulation of heart rate –Coronary Circulation. Factors regulating Blood flow

WEEK 10 UNIT TEST-III

UNIT IV URINARY AND SPECIAL SENSORY SYSTEM

Urinary system: Structure of Kidney and Nephron. Mechanism of Urine formation and acid base regulation

WEEK 11

Urinary reflex – Homeostasis and blood pressure regulation by urinary system

WEEK 12

Special senses: Eye and Ear

WEEK 13 UNIT TEST-IV

WEEK 14

UNIT V NERVOUS SYSTEM

Structure of a Neuron – Types of Neuron. Synapses and types. Conduction of action potential in neuron. Brain

WEEK 15

Divisions of brain lobes - Cortical localizations and functions - EEG. Spinal cord

WEEK-16

Tracts of spinal cord - Reflex mechanism – Types of reflex. Autonomic nervous system and its functions

WEEK-17- MODEL EXAM

WEEK-18- MODEL EXAM

TEXT BOOK:

1. Elaine.N. Marieb , "Essential of Human Anatomy and Physiology", Eight Edition, Pearson Education, New Delhi ,2007

REFERENCES:

1. Gillian Pocock, Christopher D. Richards, The human Body – An introduction for Biomedical and Health Sciences, Oxford University Press, USA, 2009
2. William F.Ganong, "Review of Medical Physiology", 22nd Edition, Mc Graw Hill, New Delhi, 2005
3. Eldra Pearl Solomon, "Introduction to Human Anatomy and Physiology", W.B. Saunders Company, Harcourt Brace Jovanovich, 2003.
4. Guyton & Hall, "Medical Physiology", 12th Edition, Elsevier Saunders, 2010

BM6311 BIOCHEMISTRY AND HUMAN PHYSIOLOGY LABORATORY

LIST OF EXPERIMENTS:

1. General tests for carbohydrates, proteins and lipids.
2. Preparation of serum and plasma from blood.
3. Estimation of blood glucose.
4. Estimation of creatinine
5. Estimation of urea
6. Estimation of cholesterol
7. Assay of SGOT/SGPT
8. Separation of proteins by SDS electrophoresis
9. Separation of amino acids by thin layer chromatography
10. Separation of DNA by agarosegel electrophoresis
11. ESR , PCV, MCH , MCV ,MCHC , total count of RBCs and hemoglobin estimation

BM6312 OOPS AND DATA STRUCTURES LABORATORY

LIST OF EXPERIMENTS:

1. Basic Programs for C++ Concepts
2. Array implementation of List Abstract Data Type (ADT)
3. Linked list implementation of List ADT
4. Cursor implementation of List ADT
5. Stack ADT - Array and linked list implementations
6. The next two exercises are to be done by implementing the following source files

i. Program source files for Stack Application 1
ii. Array implementation of Stack ADT
iii. Linked list implementation of Stack ADT
iv. Program source files for Stack Application 2
v. An appropriate header file for the Stack ADT should be included in (i) and (iv)

7. Implement any Stack Application using array implementation of Stack ADT (by implementing files (i) and (ii) given above) and then using linked list
8. Implementation of Stack ADT (by using files (i) and implementing file (iii))

9. Implement another Stack Application using array and linked list implementations of Stack ADT (by implementing files (iv) and using file (ii), and then by using files (iv) and (iii))
10. Queue ADT – Array and linked list implementations
11. Search Tree ADT - Binary Search Tree
12. Implement an interesting application as separate source files and using any of the searchable ADT files developed earlier. Replace the ADT file alone with other appropriate ADT files. Compare the performance
13. Quick Sort

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